



COMMONWEALTH of VIRGINIA

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March 3, 2005

Mr. Michael Lesar
Chief, Rules and Directives Branch
Division of Administrative Services
Office of Administration, Mail Stop T-6D59
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Draft Environmental Impact Statement for an Early Site Permit at the North
Anna ESP Site
DEQ-04-216F

Dear Mr. Lesar:

The Commonwealth of Virginia has completed its review of the Draft Environmental Impact Statement indicated above ("Draft EIS"). The Department of Environmental Quality is responsible for coordinating Virginia's review of federal environmental documents and responding to appropriate federal officials on behalf of the Commonwealth. The following agencies joined in this review:

Department of Environmental Quality ("DEQ")
Department of Game and Inland Fisheries
Department of Agriculture and Consumer Services
Department of Conservation and Recreation
Marine Resources Commission
Department of Historic Resources
Department of Mines, Minerals, and Energy
Department of Forestry

In addition, the following agencies, planning district commissions, and localities were invited to comment:

Department of Health
Department of Transportation
RADCO Planning District Commission

Thomas Jefferson Planning District Commission
Rappahannock-Rapidan Planning District Commission
Louisa County
Orange County
Spotsylvania County
Town of Mineral.

First, we appreciate the efforts of Nuclear Regulatory Commission (NRC) staff in visiting reviewing agencies in Richmond for a discussion of the Early Site Permit process and related matters on January 19, 2005. The meeting was helpful to reviewers of the Draft EIS. We also appreciate the holding of the Public Hearing for this review on February 17.

The availability of the Draft EIS and the public hearing were announced in the Federal Register on December 10, 2004 (Volume 69, Number 237, pages 71854-71855).

Project Description

Dominion Nuclear North Anna, LLC (“applicant” or “Dominion”) has applied to the Nuclear Regulatory Commission for an Early Site Permit at the North Anna Power Station site at Lake Anna. The Draft EIS considers the applicant’s proposed site for two new nuclear reactor units. The proposed site is in Louisa County near Mineral, on the existing North Anna Power Station site which is on a peninsula on the southern shore of Lake Anna about 5 miles upstream from the North Anna Dam. The applicant is considering adding the new units to the two that are in place. Cooling water for the third unit would be drawn from the Lake; the fourth unit would use dry cooling towers (Draft EIS, pages 1-5 and 1-6, section 1.2). Three additional sites are considered in the Draft EIS: one is at the applicant’s Surry Power Station in Surry County, Virginia; a second is at a U.S. Department of Energy site in Ohio; and a third site is at a Department of Energy site in South Carolina (Draft EIS, page 1.6, section 1.4; see also Chapter 8). The Nuclear Regulatory Commission’s Early Site Permit would, if issued, allow the applicant to “reserve” the site for as long as 20 years for a new nuclear power unit, and possibly to undertake site preparation and preliminary construction activities (Draft EIS, page 1-1, section 1.1).

Based on the applicant’s proposal to add two nuclear reactors to the site, the NRC has defined “bounding plant parameters” within which a future site design would be developed. The applicant has not selected a specific plant design for the new units, but will work within the “plant parameter envelope” (“PPE”) to develop the early site permit. The early site permit (“ESP”) will include a site redress plan, if issued (Draft EIS, page 1-5, section 1.2).

Environmental Impacts and Mitigation

1. Natural Heritage Resources. The Department of Conservation and Recreation has searched its Biotics Data system for occurrences of natural heritage resources in the project area. “Natural heritage resources” are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, significant geologic formations, and similar features of scientific interest. According to the Department of Conservation and Recreation, natural heritage resources have been documented in the project area. However, due to the scope of project activity and the distance to the resources, the Department of Conservation and Recreation does not anticipate that the activities pursuant to the Early Site Permit would adversely affect these natural heritage resources.

Under a memorandum of agreement between DCR and the Department of Agriculture and Consumer Services (VDACS), DCR represents VDACS in commenting on potential project impacts on state-listed threatened and endangered plant and insect species. VDACS has regulatory authority to conserve rare and endangered plant and insect species. The proposed project will not adversely affect such species, according to DCR. VDACS confirms this statement.

Because new and updated information is continually added to the Biotics Data System, NRC or the applicant should contact the Department of Conservation and Recreation’s Division of Natural Heritage (Christopher Ludwig, telephone (804) 371-6206) for updated information if a significant amount of time passes before the foregoing information on natural heritage resources is used.

See also item 8, below.

2. Air Quality. According to DEQ’s Division of Air Program Coordination, Spotsylvania County, one of the localities touching Lake Anna and potentially affected by this project, is designated for ozone non-attainment status under the Clean Air Act. For this reason, precautions are necessary to restrict emissions of volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) in undertaking project activities.

During construction, fugitive dust must be kept to a minimum by using control methods outlined in 9 VAC 5-50-60 et seq. of the Regulations for the Control and Abatement of Air Pollution. These precautions include, but are not limited to, the following:

- Use, where possible, of water or chemicals for dust control;
- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;

- Covering of open equipment for conveying materials; and
- Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion.

In addition, if project activities include the burning of any material, this activity must meet the requirements of the Regulations for open burning (9 VAC 5-40-5600 et seq.), and it may require a permit (see “Regulatory and Coordination Needs,” item 1, below). The Regulations provide for, but do not require, the local adoption of a model ordinance concerning open burning. The NRC or the applicant should contact appropriate local officials to determine what local requirements, if any, apply to open burning. The model ordinance includes, but is not limited to, the following provisions:

- All reasonable effort shall be made to minimize the amount of material burned, with the number and size of the debris piles;
- The material to be burned shall consist of brush, stumps and similar debris waste and clean-burning demolition material;
- The burning shall be at least 500 feet from any occupied building unless the occupants have given prior permission, other than a building located on the property on which the burning is conducted;
- The burning shall be conducted at the greatest distance practicable from highways and air fields;
- The burning shall be attended at all times and conducted to ensure the best possible combustion with a minimum of smoke being produced;
- The burning shall not be allowed to smolder beyond the minimum period of time necessary for the destruction of the materials; and
- The burning shall be conducted only when the prevailing winds are away from any city, town or built-up area.

3. Water Quality and Wetlands.

(a) *Wetlands.* The Draft EIS states, “a few small wetlands and two intermittent streams exist on the North Anna ESP site” (page 4-7, section 4.4.1), but no wetland delineation of the area has been accomplished. The Draft EIS also states, in several different places, that avoidance and minimization of wetland impacts will be practiced to the maximum extent practicable. Given the above information, however, DEQ cannot determine whether project activities would adversely affect wetland or stream areas subject to DEQ water permitting jurisdiction. For this reason, DEQ recommends that the applicant submit the following:

- a National Wetland Inventory (NWI) map identifying the project area;
- photographs of the intermittent streams;

- a confirmation of the wetlands delineation by the Army Corps of Engineers; and
- any other information pertaining to the location of wetlands or streams in or near the project area.

See “Regulatory and Coordination Needs,” item 2, below.

(b) Permitting Guidance. Applicable regulations require a Virginia Water Protection (VWP) Permit as follows. If the activities to be pursued under the Early Site Permit involve one or more of those listed here, the applicant must apply to DEQ for a permit; see “Regulatory and Coordination Needs,” item 2, below.

Except in compliance with a VWP permit, no person shall dredge, fill, or discharge any pollutant into, or adjacent to surface waters, or otherwise alter the physical, chemical, or biological properties of surface waters, excavate in wetlands, or ...conduct the following activities in a wetland:

1. New activities to cause draining that significantly alters or degrades existing wetland acreage or functions;
2. Filling or dumping;
3. Permanent flooding or impounding; or
4. New activities that cause significant alteration or degradation of existing wetland acreage or functions.

(See the VWP permit program regulations, 9 VAC 25-210-50.A.)

In the permit application review process, DEQ will evaluate the following, *inter alia*:

- Avoidance of wetland impacts;
- Minimization of wetland impacts;
- Amount, type, and location of compensatory wetland mitigation, based on the ecologically preferable alternative.

4. Water Resources: Flows, Drought, and Supply. The Draft EIS analyzes water resource and quality impacts considering the addition of the proposed Unit 3 as a once-through water-cooled unit and Unit 4 as a dry-cooled unit having negligible effects on water supply (page 5-3, section 5.3). DEQ’s Division of Water Resources commented previously in regard to its concerns for the adequacy of Lake Anna as a source of cooling water for a third nuclear reactor; these concerns remain.

(a) Flows and Drought. Earlier discussions between the applicant, DEQ, and the Department of Game and Inland Fisheries resulted in the selection of 248 feet above sea level as the Lake Anna water level elevation that is representative of a hydrologic drought. Based upon historical data, this level would have a recurrence interval of once every 8.7 years, and it was agreed upon as being indicative of drought conditions. This matches closely other commonly used drought indicators (e.g., 7Q10) as an indicator of drought conditions in streams for water quality and discharge permit conditions. Table 1 (Draft EIS, page F-102) can be used to evaluate the recurrence intervals of droughts. The USGS publication referenced in that table discusses drought recurrence intervals ranging from once every 15 to once every 80 years. Using elevation 248 as an indicator, past Dominion records demonstrate that this level has been observed 3 times in the last 26 years, a reasonable expectation of the recurrence interval (8.6 years) for a drought. Addition of Unit 3 would increase the drought recurrence interval to every 2.6 years and more than double the total weeks of flows that are 20 cubic feet per second (cfs) or lower from 67 to 143. Median duration of drought flows of 20 cfs would be 7 weeks with the proposed Unit 3. Virginia State Water Control Board Bulletin #58 reviewed flow statistics for the gauge downstream at Doswell. Prior to dam construction, flows of 25 cfs or lower would occur once every 10 years for about 10 weeks. Addition of Unit 3 would significantly increase the frequency of drought flows downstream, and the duration of those droughts. The change to drought flows once every 2.6 years, for median duration of 7 weeks, is a significant change from conditions prior to the plant/reservoir construction (see item 4(b), below), and demonstrates the need for cumulative analysis of impacts.

(b) Water Supply. One of the major earlier concerns of DEQ's Division of Water Resources was the lack of an identifiable source of water for the proposed fourth reactor (Unit 4). The applicant has indicated, according to the Division, that the proposed Unit 4 would be air-cooled (see Draft EIS, page 5-3, section 5.3 as well); the Division would have no objection to an air-cooled unit. However, the fact that the fourth unit would be air cooled does not allay the Division's concern about the adequacy of Lake Anna as a water supply for a third nuclear reactor. The Division looked at other nuclear reactors along the East Coast to compare the water resources available to them with the water resources available at North Anna (see "Table 1," first enclosure to this letter). The conclusions drawn from that research are:

- Most of the intake locations are tidal and have an essentially unlimited water supply;
- Of the remaining locations, the North Anna location has the least abundant water supply, based on the average flow of a small watershed (342 square miles) and a medium-sized reservoir; and

- There is a limited number of nuclear power stations located on non-tidal rivers. In these cases, the power plants are on large rivers such as the Connecticut and the Susquehanna.

In fact, the only location remotely similar to North Anna's situation is the Oconee plants on Lake Keowee in South Carolina. However, immediately below Lake Keowee is Hartwell Lake, so the section of non-tidal stream affected by consumptive loss is very short.

(c) Cumulative Impacts and Downstream Effects. Cumulative impacts of the current and future units on downstream hydrology and biology need to be quantitatively evaluated before any determination can be made that effects of the proposed addition of reactors to the site are "small" (page 5-10, section 5.3.2, line 9). Two options exist to reduce the significant impacts on downstream resources, according to the Department of Game and Inland Fisheries:

- Change the trigger level of elevation (248 feet) to some lower elevation that has a recurrence interval of once every 8.7 years, or
- Have Unit 3 operate under dry cooling conditions, as is proposed for Unit 4.

(d) Frame of Reference for Flows. The Department of Game and Inland Fisheries and DEQ's Division of Water Resources requested the applicant to perform an Index of Hydrologic Alteration (IHA) analysis of pre- and post-project flows below the dam (see Draft EIS, page F-122 through F-125 and the tables on pages F-126 through F-133). The two state agencies had pre-dam conditions in mind when they addressed "pre-project" conditions in their earlier discussions with the applicant. However, the tables on pages F-126 through F-133 do not evaluate pre-dam conditions and therefore cannot be considered complete. Table 1 (pages F-126 and F-127) demonstrates significant shifts in frequency of lower flows and needs to be expanded to address conditions prior to the creation of the lake. The Division of Water Resources clarifies that by "pre-project," it meant no dam and no reactors; by "post-project," it meant the lake and three once-through cooling units. This Indicators study was requested in order to assess the cumulative impact of the existing and proposed project activities on the North Anna River. A cumulative analysis of impacts of the project does not start, in our judgment, with the existing lake conditions (i.e., the lake and two reactors) and then add, incrementally, the effects of operation of the proposed third reactor (so that the "post-project" condition is the lake and three reactors). However, the Nuclear Regulatory Commission has accepted this approach, which means that a finding of no more than "moderate" impacts of the third unit (page 5-10, section 5.3.2, lines 7-13) is not surprising even if cumulative impacts have not been analyzed.

Dominion provided DEQ's Division of Water Resources (DWR) with the output of a simulation model with which Division staff is able to make some comparisons of true pre- and post-project conditions. Prior to the lake, the North Anna River at the dam site had an average flow of about 286 cubic feet per second (cfs). This is based on the flow records from 1929 to 1971 at the Doswell gauge, proportionately reduced to reflect the smaller drainage area at the dam. According to the NRC water budget analysis, the two existing units account for 50 cfs in evaporation and the third unit would account for 26 cfs in evaporation. The cumulative impact on the average flow of just the power plants (not including lake evaporation) is therefore estimated to be 76 cfs or 26% of the historic average flow. Such a large loss of the normal flow to consumptive uses is unprecedented in Virginia and other mid-Atlantic states. The U.S. Geological Survey (USGS) estimates that the average percentage of surface water lost to consumptive use in the mid-Atlantic states is 1.6% of average flow. (USGS, 1984, National Water Summary)

DWR examined pre-dam gauge records and compared those streamflow records with projected releases with three reactors operating in a once-through cooling mode. This is not a true IHA analysis but it is presented in order to give some perspective of the magnitude of true pre- and post-project conditions.

- Prior to the project, flows at the dam site were less than or equal to 20 cfs only 4.2% of the time; with the third unit, flows are projected to be 20 cfs 11.8% of the time.
- Prior to the project, flows at the dam site were greater than or equal to 156 cfs 52% of the time (pre-dam Doswell gauge); with three units, flows will be less than or equal to 40 cfs 52% of the time (Draft EIS, page 5-12, section 5.4.1.3),
- Prior to the project, during the driest 14-month period on record (early May 1931 to early July 1931) streamflow in the North Anna River averaged 90 cfs over the 14 months. With the three units, the driest 14-month period (mid- September 2001 through mid-January 2003) streamflow in the North Anna River would average only 20 cfs.

DWR disagrees with the conclusion in the Draft EIS that these pre- and post-project flow alterations and their impact can be described as small or moderate. Instead, DWR would characterize these types of alterations as large.

(e) Preferences in Cooling Method. DEQ's Division of Water Resources prefers the once-through cooling process proposed for Unit 3 to a cooling tower because the once-through process results in less consumptive use of water than the cooling tower. This preference would result in larger impingement and entrainment losses (see item 7(c), below) and a larger heat load to the Lake than the cooling tower. DEQ's Division of

Water Resources recognizes that the cooling tower is not proposed in the Draft EIS, but some commenters may propose it as a solution to thermal loading and impingement and entrainment concerns. In any case, DEQ's Division of Water Resources would defer to DEQ's Division of Water Quality in regard to thermal impacts of any water-cooled units that might be proposed.

The once-through cooling process would also entail larger impingement and entrainment losses. DEQ's Division of Water Resources defers to the Department of Game and Inland Fisheries with regard to impingement and entrainment estimates; see item 8(c), below.

(f) Alternatives Analysis: Surry Power Station site versus North Anna site. The Draft EIS indicates that a first-stage of examination aims to determine whether any alternative site is environmentally preferable to the proposed site. Based on the results of this review, the NRC examines alternatives for other factors and decides whether an alternative site is "obviously superior" to the proposed site (Draft EIS, page 8-1). DEQ's Division of Water Resources believes that the Surry site is "superior" (as described in the Draft EIS) to the North Anna site based on the following reasons:

- the limited water resources in the North Anna River watershed;
- the amount of those resources that are already being consumed by lake evaporation and the forced evaporation from the existing two reactors; and
- the competition for those resources downstream.

It appears that water availability would not be an issue on the tidal James River at Surry. The Draft EIS says, "The consumptive use of water to support mechanical draft cooling towers would be undetectable relative to the supply in the estuary."

At two meetings with DEQ staff, NRC officials were asked why North Anna rather than Surry was being proposed for an early site permit. On both occasions, NRC staff cited aesthetics and the fact that the plant might be visible from Jamestown. However, the Draft EIS, in its discussion of aesthetics (pages 8- 32 and 8-33), does not indicate that there is any problem with aesthetics at Surry. In fact, the Draft EIS states that the Surry plant's "current structures are not visually obtrusive from any vantage point, even from across the James River. However Units 1 and 2 are visible from the highest amusement rides at Busch Gardens" (page 8-32). The concerns about aesthetics are not supported by statements in the Draft EIS.

Impingement and entrainment issues would be a greater problem at the Surry site than at Lake Anna. This is because the James River is an estuary at the Surry site.

However, the alternatives section states that reactors at Surry would be cooled with cooling towers (Draft EIS, page 8-15, section 8.5). As such, the impingement and entrainment problem would be less than if once-through cooling were to be used. On April 4, 2001, Dr. John Olney of Virginia Institute of Marine Resources wrote to Mr. Tony Banks of Dominion Power on the subject of impingement and entrainment at Surry while commenting on the re-licensing of the plant. In the letter Dr. Olney states, "Further, the available information on abundance and distribution of fishes at the site suggests that there is a low probability that water withdrawals at the plant are causing declines in federally managed species." Since Dr. Olney does not express concerns about a large once-through cooling water withdrawal, it appears that a cooling tower withdrawal, orders of magnitude smaller, would also not be a concern.

In conclusion, based on the information provided, two of the most important disadvantages of the Surry site (impingement and entrainment, and aesthetics), are not substantiated, while the main disadvantage of the North Anna site (water availability) appears extremely problematic. The DWR would have no concerns about this project if both the fourth and third reactors at North Anna were air cooled.

5. Solid and Hazardous Waste Management. According to DEQ's Waste Division, the Draft EIS addressed solid waste issues and sites to some extent, but did not address hazardous waste issues or sites, or include a search of waste-related data bases.

(a) Data Base Results. DEQ's Waste Division did a cursory review of its data files and determined that the North Anna Power station is listed as follows:

- "Vepco-North Anna" (identification number VAD000620237) in the CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) data base; no further remedial action is planned, according to the CERCLA listing.
- "Virginia Power North Anna" (identification number VAD065376279) in EPA's RCRA (Resource Conservation and Recovery Act) data base, as a small-quantity generator of hazardous waste.

The following web sites may be helpful in locating additional information for these identification numbers:

- http://www.epa.gov/echo/search_by_permit.html
- http://www.epa.gov/enviro/html/rcris/rcris_query_java.html.

(b) *Solid Wastes.* The Draft EIS indicates that solid waste would be handled in compliance with appropriate state and federal regulations (page 3-10, section 3.2.4). See the citations in item 5(c), next.

(c) *Radioactive or Other Contaminated Waste.* The Draft EIS indicated the potential risk of radioactive waste occurring on site after construction (pages 4-39, 4-40, 6-22, and 8-12). Any soil suspected of radioactive wastes or other contamination generated during construction-related activities (including site preparation) must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations. These include, but are not limited to:

- Federal laws and regulations: Resource Conservation and Recovery Act (RCRA) (42 U.S.C. sections 6901 et seq.); U.S. Department of Transportation Rules for Transportation of Hazardous Materials (49 CFR Part 107); applicable regulations in Title 40, Code of Federal Regulations (CFR).
- State laws and regulations: Virginia Waste Management Act (*Virginia Code* sections 10.1-1400 et seq.); Virginia Hazardous Waste Management Regulations (9 VAC 20-60); Virginia Solid Waste Management Regulations (9 VAC 20-80); Virginia Regulations for the Transportation of Hazardous Materials (9 VAC 20-110).

(d) *Demolition and/or Renovation of Structures.* The discussion of the Site Redress Plan (Draft EIS, page 4-46) raises the potential for structures to be demolished or removed. These should be checked for lead-based paint and asbestos before any action takes place. If lead-based paints are found, NRC or the applicant must comply with the rules in the Virginia Hazardous Waste Management Regulations (9 VAC 20-60-261); if asbestos-containing materials are found, compliance with the Virginia Solid Waste Management Regulations (9 VAC 20-80-640) is required.

(e) *Pollution Prevention.* DEQ encourages NRC and the applicant to implement pollution prevention principles in all construction activities. This includes reducing wastes at the source, re-using materials, and recycling waste materials. Generation of hazardous waste should be minimized, and hazardous waste should be handled appropriately in keeping with the rules cited in item 4(c) above. See also item 9, below.

6. Erosion and Sediment Control; Stormwater Management.

(a) *Erosion and Sediment Control Plans.* If any activities pursuant to the Early Site Permit will disturb 10,000 square feet or more, the property owner is responsible for submitting a site-specific Erosion and Sediment Control Plan to the affected County for review and approval pursuant to the local Erosion and Sediment Control ordinance,

according to the Department of Conservation and Recreation. All regulated land-disturbing activities associated with the project, including on- or off-site access roads, staging areas, or spoil or borrow areas, must be covered by an approved Plan. The Plan, in turn, must be prepared and implemented in accordance with the Virginia Erosion and Sediment Control Law (*Virginia Code* section 10.1-563), the Virginia Erosion and Sediment Control Regulations (see 4 VAC 50-30-30, 4 VAC 50-30-100), and the *Virginia Erosion and Sediment Control Handbook*, which aids the project proponent in meeting the legal and regulatory requirements. See “Regulatory and Coordination Needs,” item 5(a), below.

(b) Stormwater Management Plans. Depending on local requirements, a separate Stormwater Management Plan may also be required for land-disturbing activities. Stormwater Management Plans must be prepared and implemented in accordance with the Virginia Stormwater Management Law (*Virginia Code* section 10.1-603.3) and the Virginia Stormwater Management Regulations (4 VAC 3-20-90 through 3-20-141). See “Regulatory and Coordination Needs,” item 5(b), below.

General information on recent changes to stormwater management requirements is available at the Department of Conservation and Recreation’s web site:

- <http://www.dcr.virginia.gov/sw/vsmp.htm#geninfo>.

These changes include transfer of a related stormwater management program, the Virginia Pollutant Discharge Elimination System (VPDES) Stormwater General Permit for Construction Activities, from the Department of Environmental Quality to the Department of Conservation and Recreation. See “Regulatory and Coordination Needs,” item 5(c), below.

7. Historic Structures and Archaeological Resources. The Nuclear Regulatory Commission is consulting directly with the Department of Historic Resources pursuant to section 106 of the National Historic Preservation Act. The Department expects this consultation to continue.

8. Wildlife Resources.

(a) Department of Game and Inland Fisheries Powers and Duties. The Department of Game and Inland Fisheries, as the Commonwealth’s wildlife and freshwater fish management agency, exercises enforcement and regulatory jurisdiction over wildlife and freshwater fish, including state or federally listed endangered or threatened species, but excluding listed insects. The Department (hereinafter “DGIF”) is a consulting agency under the U.S. Fish and Wildlife Coordination Act (16 U.S.C. sections 661 et seq.), and provides environmental analysis of projects or permit

applications coordinated through the Department of Environmental Quality, the Marine Resources Commission, the Virginia Department of Transportation, the U.S. Army Corps of Engineers, the Federal Energy Regulatory Commission, and several other state and federal agencies. DGIF determines likely impacts upon fish and wildlife resources and habitat, and recommends appropriate measures to avoid, reduce, or compensate for those impacts.

(b) Department of Game and Inland Fisheries Assessment. DGIF continues to have reservations about the impacts of proposed Unit 3 on the lake and downstream resources. The Draft EIS does not address the main concerns outlined in the DGIF letter, dated January 27, 2004.

The nomenclature of the Draft EIS on native vs. non-native species appears to minimize the value of the striped bass fishery (Draft EIS, section 2.7.2.1, pages 2-33 through 2-40). Striped bass and other anadromous fish are native to the York River drainage and the North Anna River, while largemouth bass, bluegill, black crappie, walleye, and channel catfish are not. Nevertheless, all of these species are important to the recreational fishery in the lake.

(c) Impingement and Entrainment: Estimates. The Department of Game and Inland Fisheries (DGIF) applauds the applicant's use of "worst case" scenarios for estimating impingement and entrainment, and acknowledges the estimate of a 131% increase in the impingement rate for Unit 3 (Draft EIS, pages 5-13 through 5-18, sections 5.4.2.1 and 5.4.2.2). In developing the total estimate, data derived from 1979 through 1983 was added to worst-case Unit 3 operation. However, it is not clear whether the 1979-1983 values for Units 1 and 2 reflect current operating conditions and are valid. The Final EIS should indicate whether water volume pumped for these units has increased or decreased since the 1979-1983 study period, in light of the facts that plant operating time, efficiency, and volume of water pumped have all increased. In such case, the table reflecting the impacts of Units 1 and 2 (Table 5-1, page 5-17) needs to be revised to reflect current operating conditions.

(d) Entrainment and Impingement Recommendations. The Department of Game and Inland Fisheries recommends the use of state-of-the-art intake screens, as encouraged by the U.S. Environmental Protection Agency in recent screen recommendations. Specifically, the Department of Game and Inland Fisheries recommends openings of 1 millimeter (mm), and an intake velocity of 0.25 feet per second (fps) to protect aquatic life. This would greatly alleviate the impingement and entrainment issue, as would the use of a dry cooling tower.

(e) Presentation of Data. As indicated above (item 4(d)), the "pre-project" conditions should be based on the condition of the area before the lake and dam were

constructed in the 1970s. Table 1 in Appendix F (pages F-126 and F-127) is one example of this; it demonstrates significant shifts in frequency of lower flows and needs to be expanded to address conditions prior to creation of the lake.

(i) *Tables in Chapter 5.* The tables in Chapter 5 of the Draft EIS have several problems. Tables 5-4 through 5-6 (pages 5-22 through 5-24) reflect seasonal losses from March through July, so the “Yearly Totals” column is not appropriately named. To properly reflect yearly totals, losses for the remaining seven months need to be added to the table. If summer, fall, and winter data were not collected, that data may have to be extrapolated by the best fitting of a non-linear function to the available data. Only then can the full impacts of entrainment on important fish species begin to be addressed.

Tables 5-2 (page 5-18) and 5-5 (page 5-23) may have significant errors, or the reasons for the differences are not fully explained. For example, in Table 5-2, for Unit 3, January striped bass and bluegill numbers impinged are greater than in Units 1 and 2 (Table 5-1, page 5-17), but black crappie, gizzard shad, white perch, and yellow perch numbers are less than in Units 1 and 2. Similar discrepancies exist for other rows in the table, and for the cumulative Tables 5-3 and Table 5-6. These discrepancies should be explained further.

(ii) *Characterization of Impacts on Fisheries.* The Department of Game and Inland Fisheries disagrees with the assessment that the impact of Unit 3 upon gizzard shad, the most prevalent species, would be a “small” impact (page 5-21, end of section 5.4.2.2). As DGIF states:

Gizzard shad are indeed a “prolific forage fish,” but their abundance has been low in VDGIF samples in two recent years. This species is the primary forage for stocked pelagic predators (striped bass and walleye) and also supplements largemouth bass diet. Further declines in striped bass habitat (another contested issue) combined with potential reductions in the forage base could significantly impact this recreationally and economically important fishery. Section 5.4.2.2 estimates the impingement loss to the fish population as a percentage of the estimated total lake population as derived from cove rotenone. We applied this same technique to entrainment numbers and calculate that 6.8% of the gizzard shad and 87% of the black crappie are lost due to entrainment. When combined with impingement 7.7% of the gizzard shad and 93.9% of the black crappie numbers are killed by the intake structure. We do not consider losing almost 8 and 94% of these populations from an intake a small impact. Several problems exist with this approach and these need to be addressed. Lakes undergo eutrophication with age and that is occurring at Lake Anna as the watershed becomes more fully developed. As that occurs, the biomass of fish increases. The current biomass is undoubtedly higher than twenty years ago when the original entrainment/impingement analysis was conducted. The report uses cove rotenone data but does not account for spatial and temporal variation within that data. Within large reservoirs, biomass typically declines downstream through a trophic gradient. That is apparent from our routine sampling as well as historic rotenone data. The impacts of entrainment and

impingement may be even more spatially and numerically significant in the lower lake where the numbers of fish are less than above the Rt. 208 bridge.

The Department points out that the conclusions regarding entrainment losses in the Draft EIS are not based on scientifically sound evidence. This is exemplified by the statement:

Because the fish entrained most frequently are prolific, exhibit a high reproductive potential, and compensatory responses of the fish population occur to offset losses, the staff concludes that the impacts of entrainment would be SMALL [emphasis in the original].

(See Draft EIS, page 5-25, end of section 5.4.2.3.)

(iii) *Recommendations.* The Department of Game and Inland Fisheries recommends that the entrainment tables be corrected to reflect an actual annual loss. The discrepancies should be corrected and a much more rigorous spatial and temporal evaluation conducted before any conclusion can be reached that the effects of impingement and entrainment are small.

(f) Striped Bass Reservoir Habitat.

(i) *Description and Habitat.* The Department of Game and Inland Fisheries agrees with the descriptive statements on page 5-30, lines 24-33 of the Draft EIS. However, line 37 incorrectly states that striped bass are not native to this watershed. The use of nomenclature surrounding native vs. nonnative species appears to minimize the value of the striped bass fishery. This is incorrect. Striped bass are, in fact, native to the York River drainage and downstream reaches of the North Anna can be seasonally important for spawning and juvenile rearing. The lake population is correctly acknowledged as being supported by stocking. In recognition of this fact, the Department of Game and Inland Fisheries strives to stock Chesapeake strain striped bass in the reservoir so as not to change the genetics of downstream populations.

(ii) *Impacts of Temperature and Flow Changes.* An extensive amount of temperature data from historic monitoring of the lake was used to model thermal conditions at various locations in the lake. Despite that extensive data set, no modeling of summer striped bass habitat was conducted to support statements that the impacts would be small in normal years and moderate in drought years (Draft EIS, page 5-31, lines 18-19). In combination with the elevated temperatures and increased frequency of drought conditions (lowering to elevation 248) within the lake, the striped bass population could be stressed every 2.6 years. Based on the information in the Draft EIS, it is inconclusive whether the installation of a third unit *would* cause acute mortality from exacerbated summer habitat squeeze. It is also inconclusive, however, that such mortality *would not* occur. At some point, striped bass will begin to die as water quality declines (based primarily on higher water temperatures and lower dissolved oxygen).

Since no modeling of summer habitat was conducted, it is unknown whether the additive impacts of a third unit would allow reservoir conditions to reach this point, and the exact point at which this will occur is unknown; but to discount the possibility is subjective. Even with the elimination of Unit 4, the predicted maximum surface temperature increase at the dam of 3.6 degrees Fahrenheit could result in striped bass mortalities depending on the plume configuration, inflow, and stratification pattern. Striped bass habitat modeling is essential in the Final EIS to explain the potential of a new (third) unit and its impact on striped bass habitat.

(iii) Drought Comment. The following comment in the Draft EIS regarding droughts, “In such circumstances, mitigation to reduce the impact could be accomplished by stocking more fish, stocking larger fish, or managing the fishery to provide more catch opportunities of large fish,” is incorrect and not a scientifically recognized fishery management solution. Such a comment does not recognize the biological and physical factors necessary for a successful striped bass population.

(g) North Anna River Fishery Issues. According to the Department of Game and Inland Fisheries, the downstream impacts to fisheries resources were ignored in the Draft EIS in spite of the increased frequency of low flows that a third water-cooled unit would produce. Currently, (with two units in the regulated “base scenario”), 67 weeks of drought conditions (20 CFS or less) out of a 26-year period would be expected. Given the addition of a third unit, the expected drought frequency would rise to 150 weeks (about 2.6 years).

(i) Analysis of Flows. The Tennant method is a common desktop method and summer flows in the 20-30% mean annual flow (MAF) range are beneficial for sustainable fisheries. Because it has been called the Montana Method, it has been deemed as only applicable in Western streams. That misconception is false, as it was developed “over the past 17 years from work on hundreds of streams in the states north of the Mason-Dixon Line between the Atlantic Ocean and the Rocky Mountains” (Fisheries 1(4): 6-10). Summer flows below the desired level of 68 cubic feet per second (cfs), or 20% of MAF, are the norm under current conditions and will worsen under future conditions. The Department of Game and Inland Fisheries recommended that an In-stream Flow Incremental Methodology (IFIM) Study be conducted to properly evaluate this project on the stream fauna. The expected increased frequency of drought flows to a common occurrence (2.6 years) is expected to have significant impacts. Conclusions need to be based upon sound scientific modeling. DGIF states that if Dominion can offer a better approach to modeling flow impacts, that Department would be happy to consider any alternative.

(ii) Impacts on River Resources. According to DGIF, the Draft EIS makes the following statement:

... long-term monitoring of the North Anna River has documented improvements in the abundance and diversity of aquatic biota since impoundment.

DGIF is unaware of any intensive data analysis to support such an assertion. DGIF's analysis of the Dominion data set documented changes that are reflective of drought conditions. Placing the population of aquatic species under frequent drought stress will shift the community substantially. This analysis was previously provided to Dominion. Recent DGIF surveys of the North Anna River have suggested that the primary sportfish, smallmouth bass, has much lower abundances than in other rivers in the region. Other fish populations were present in relatively low levels. It is the opinion of DGIF biologists that the low abundance and biomass of predator and forage species in the North Anna River is related to higher than naturally occurring incidences of drought conditions. There also is the possibility that drought flow conditions could adversely impact downstream anadromous nursery areas. This potential impact should be evaluated. Increasing the drought frequency to the proposed extent would have an unacceptable negative impact on this fishery.

(iii) Modeling versus Speculation. The balance of a major argument within the document centers on subjective speculation on whether the installation of Units 3 and/or 4 would present complications for fish populations. DGIF believes that such complications would occur. More likely at issue is not if complications would occur, for they almost certainly would; but the extent of such complications and the population-level impacts. Without extensive modeling, it is impossible to argue either point successfully. We recommend the application of sound scientific modeling to the decision process and that appropriate corrections based on model outcomes be incorporated in the Final EIS.

9. Downstream Flows and Recreation. The North Anna River is a spectacularly scenic and remote canoeing river with excellent fishing, according to the Department of Conservation and Recreation. Accordingly, discharge rates from the Lake Anna Dam should be adequate to meet minimum in-stream flows needed for recreational boating from State Route 601 to U.S. Route 301. The Department of Conservation and Recreation recommends that a minimum in-stream flow recreation study be conducted to determine what this discharge rate should be.

10. Chesapeake Bay Preservation Areas. According to the Department of Conservation and Recreation's Division of Chesapeake Bay Local Assistance, the project area, which is in Louisa County (Draft EIS, page 2-5, section 2.2.1), is not within a Chesapeake Bay Preservation Act jurisdiction.

11. Pollution Prevention. DEQ advocates that principles of pollution prevention be used in all construction projects as well as in facility operations. Effective siting, planning, and on-site Best Management Practices (BMPs) will help to ensure that

environmental impacts are minimized. However, pollution prevention techniques also include decisions related to construction materials, design, and operational procedures that will facilitate the reduction of wastes at the source. We have several pollution prevention recommendations that may be helpful in constructing or operating this project:

- Consider development of an Environmental Management System (EMS). An effective EMS will ensure that the proposed facility is committed to minimizing its environmental impacts, setting environmental goals, and achieving improvements in its environmental performance. DEQ offers EMS development assistance and recognizes facilities with effective Environmental Management Systems through its Virginia Environmental Excellence Program.
- Consider designs, techniques, and technologies that will facilitate the re-circulation and re-use of waters used for cooling and steam generation. These techniques can save money by minimizing intake and treatment needs.
- Consider environmental attributes when purchasing materials. For example, the extent of recycled material content, toxicity level, and amount of packaging should be considered and can be specified in purchasing contracts.
- Consider contractors' commitments to the environment (such as an EMS) when choosing contractors. Specifications regarding raw materials and construction practices can be included in contract documents and requests for proposals.
- Choose sustainable materials and practices for infrastructure and building construction and design. These could include asphalt and concrete containing recycled materials, and integrated pest management in landscaping, among other things.
- Integrate pollution prevention techniques into facility maintenance and operation, to include the following: inventory control (record-keeping and centralized storage for hazardous materials), product substitution (use of non-toxic cleaners), and source reduction (fixing leaks, energy-efficient HVAC and equipment). Maintenance facilities should be designed with sufficient and suitable space to allow for effective inventory control and preventive maintenance.

DEQ's Office of Pollution Prevention provides free information and technical assistance relating to pollution prevention techniques and EMS. If interested, NRC and/or the applicant contact that Office (Tom Griffin, telephone (804) 698-4545).

12. Mineral Resources. The Department of Mines, Minerals, and Energy, noting that an early site permit allows a suitability study, has no comment. If the study is

conducted in the future, the Department requests that it be given an opportunity to review the material on geology and mineral resources of the site.

13. Forest and Tree Protection. According to the Department of Forestry, the activities pursuant to the Early Site Permit will not significantly affect the forests of the Commonwealth. We offer the following guidance for protection of individual trees, or forested areas, in the project vicinity.

In order to protect trees in the project area from the effects of construction activities associated with this project, the proponent should mark and fence them at least to the dripline or the end of the root system, whichever extends farther from the tree stem. Marking should be done with highly visible ribbon so that equipment operators see the protected areas easily.

Parking and stacking of heavy equipment and construction materials near trees can damage root systems by compacting the soil. Soil compaction, from weight or vibration, affects root growth, water and nutrient uptake, and gas exchange. The protection measures suggested above should be used for parking and stacking as well as for moving of equipment and materials. If parking and stacking are unavoidable, the applicant should use temporary crossing bridges or mats to minimize soil compaction and mechanical injury to plants.

Any stockpiling of soil should take place away from trees. Piling soil at a tree stem can kill the root system of the tree. Soil stockpiles should be covered, as well, to prevent soil erosion and fugitive dust.

Questions on tree protection may be directed to the Department of Forestry (Mike Foreman, telephone (434) 977-6555).

14. Local and Regional Concerns. As indicated above (pages 1 and 2), DEQ invited three regional Planning District Commissions, three Counties, and one Town to comment on the Draft EIS.

Regulatory and Coordination Needs

1. Air Quality Regulation. In the event any open burning is planned, the applicant must contact DEQ's Northern Virginia Regional Office (Terry Darton, telephone (703) 583-3845) to determine whether an open burning permit is required, and, if so, how to apply. Similarly, that Office should be contacted to determine permitting requirements applicable to any fuel-burning equipment used in construction or in buildings.

2. *Water Quality Regulation.* As indicated above (“Environmental Impacts and Mitigation,” item 3(a)), the applicant must furnish information to DEQ’s Northern Virginia Regional Office to obtain a determination of the need for a Virginia Water Protection Permit for wetland impacts from Early Site Permit activities. The information, listed in the above discussion, requires that a wetland delineation be accomplished in the areas which might be affected by Early Site Permit activities and that the applicant obtain Army Corps of Engineers confirmation of the delineation. This information should be submitted to:

DEQ, Northern Virginia Regional Office
Attn: Tom Faha, Water Permits Manager
13901 Crown Court
Woodbridge, Virginia 22193

Questions may be addressed to that Office (Tom Faha, telephone (703) 583-3846).

In addition, activities contemplated by the regulatory provision cited above (see “Environmental Impacts and Mitigation,” item 3(b)) will require Virginia Water Protection Permits from DEQ’s Northern Virginia Regional Office.

3. *Subaqueous Bed Encroachment.* Any encroachment in, on, or over state-owned riverbeds, or the state-owned beds of bays, streams, or creeks that is channelward of ordinary high (above the fall line) or channelward of mean low water (in tidal waterways below the fall line) may require a permit from the Marine Resources Commission. Questions may be addressed to the Commission in this regard (Jeff Madden, telephone (757) 247-2200).

4. *Wildlife Resources: Endangered and Threatened Species.* The NRC and the applicant should coordinate with the Virginia Department of Game and Inland Fisheries (Andy Zadnik, telephone (804) 367-2733) relative to a review of threatened and endangered species. Coordination with the Virginia Field Office of the U.S. Fish and Wildlife Service (Karen Mayne, telephone (804) 693-6694) would also be in order.

5. *Erosion and Sediment Control; Stormwater Management.*

(a) *Erosion and Sediment Control Plan.* The applicant should contact Louisa County authorities (starting with the County Administrator, C. Lee Linticum (telephone (540) 967-0401) to for guidance on submission of Erosion and Sediment Control Plans for project activities pursuant to the Early Site Permit, if it is issued.

(b) Stormwater Management Plan. The applicant should contact Louisa County authorities (see item 5(a), above) for guidance on submission of stormwater management plans for project activities under the Early Site Permit, if the permit is issued by NRC.

(c) Stormwater Management Changes. As indicated above (“Environmental Impacts and Mitigation,” item 6(b)), the VPDES Stormwater General Permit for Construction Activities has been transferred from the Department of Environmental Quality to the Department of Conservation and Recreation. The applicant may contact the Department of Conservation and Recreation Division of Soil and Water Conservation (Mr. C. Lee Hill, telephone (804) 786-3998) for guidance on the transfer of the program and applicability of program requirements to land-disturbing activities.

6. Historic Structures and Archaeological Resources. As indicated above (“Environmental Impacts and Mitigation,” item 7), NRC is consulting with the Department of Historic Resources (Dr. Ethel Eaton, telephone (804) 367-2323, extension 112) to ensure compliance with section 106 of the National Historic Preservation Act.

Thank you for the opportunity to review the Draft EIS. We look forward to reviewing the Final EIS for the North Anna Early Site Permit.

Sincerely,

Ellie L. Irons
Program Manager
Office of Environmental Impact Review

Enclosures

cc: (next page)

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Page 22

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Jack Cushing, NRC
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